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EI <120> METHOD FOR OBTAINING PLANT VARIETIES

<130> A33153-PCT-USA 072667.0128

<140> 09/529,239

<141> 2000-10-27

<150> PCT/EP98/06977

<151> 1998-10-09

<160> 100

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<223> I

<223> Degenerate oligonucleotides UPMU used to isolate  
AtMSH3 and AtMSH6.

<300>

<301> Reenan and Kolodner

<302> Genetics

<303> 132

<306> 963-973

<307> 1992

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23

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<223> Degenerate oligonucleotides DOMU used to isolate  
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<222> (15)...(15)

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<211> 24

<212> DNA

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<223> MSH3 specific primer 636 for PCR using cDNA of  
Arabidopsis thaliana ecotype Columbia.

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24

<210> 4

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer AP1 for PCR using cDNA of Arabidopsis  
thaliana ecotype Columbia containing adapter  
sequences ligated to both its ends.

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27

<210> 5

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer AP2 for PCR using cDNA of Arabidopsis  
thaliana ecotype Columbia containing adapter  
sequences ligated to both its ends.

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<210> 6  
 <211> 30  
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<220>  
 <223> MSH3 specific primer S525 for PCR using cDNA of  
 Arabidopsis thaliana ecotype Columbia.

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<210> 7  
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 <212> DNA  
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<220>  
 <223> MSH3 specific primer S51 for PCR using cDNA of  
 Arabidopsis thaliana ecotype Columbia.

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<220>  
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 Arabidopsis thaliana ecotype Columbia.

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<210> 9  
 <211> 28  
 <212> DNA  
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<220>  
 <223> MSH3 specific primer S523 for PCR using cDNA of  
 Arabidopsis thaliana ecotype Columbia.

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<210> 10  
 <211> 33  
 <212> DNA  
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<220>

<223> MSH3 specific primer 1S5 for PCR using cDNA of  
Arabidopsis thaliana ecotype Columbia.

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atcccgggat gggcaagcaa aagcagcaga cga

33

<210> 11

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> MSH3 specific primer S53 for PCR using cDNA of  
Arabidopsis thaliana ecotype Columbia.

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27

<210> 12

<211> 1250

<212> DNA

<213> Arabidopsis thaliana ecotype Columbia

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<221> misc\_feature

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gccactgtat ccttctctcc ttccaagcgt aagcttctct ccgaccacct cgcgcgcgcg 180  
tcacccaaaa agcctaaact ttctctctac actcaaaacc cagtaccgca tcccaattta 240  
caccaaagat ttctccagag atttctggaa ccctcgccgg aggaatatgt tcccgaaacg 300  
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<211> 34

<212> DNA

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<220>

<223> MSH3 specific primer 2S5 for PCR using cDNA of  
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34

<210> 14  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> MSH3 specific primer S52 for PCR using cDNA of  
Arabidopsis thaliana ecotype Columbia.

<400> 14  
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27

<210> 15  
<211> 2110  
<212> DNA  
<213> Arabidopsis thaliana ecotype Columbia

<220>  
<221> misc\_feature  
<222> (0)...(0)  
<223> Clone 13

<400> 15  
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cactagcaca cagcaggtg tagccattgc ctatgcaaca ttacagcatc tcctagcaga 1620  
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gagcttttggg ttttaagggtg ctcagcttgc ccagataacct ccatcatgta tacgtcgagc 1860
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tgacttgttt gcagacctga aatttgctct ctctgaagag gacccttgga aagcattcga 2040
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<210> 16  
 <211> 29  
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 <213> Artificial Sequence

<220>  
 <223> MSH3 specific primer S51 for PCR using cDNA of  
 Arabidopsis thaliana ecotype Columbia.

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<400> 16
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<210> 17  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> MSH3 specific primer S525 for PCR using cDNA of  
 Arabidopsis thaliana ecotype Columbia.

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<400> 17
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<210> 18  
 <211> 3522  
 <212> DNA  
 <213> Arabidopsis thaliana ecotype Columbia

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 <223> AtMSH3 full-length cDNA and deduced sequence of  
 the encoded polypeptide.

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catttctctt aaacggagga gattacgaat aaagcaatt atg ggc aag caa aag    114
                                     Met Gly Lys Gln Lys
                                     1           5

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cag cag acg att tet cgt ttc ttc gct ccc aaa ccc aaa tcc ccg act    162
Gln Gln Thr Ile Ser Arg Phe Phe Ala Pro Lys Pro Lys Ser Pro Thr
          10                15                20

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cac gaa ccg aat ccg gta gcc gaa tca tca aca ccg cca ccg aag ata    210
His Glu Pro Asn Pro Val Ala Glu Ser Ser Thr Pro Pro Pro Lys Ile
          25                30                35

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tcc gcc act gta tcc ttc tct cct tcc aag cgt aag ctt ctc tcc gac	258
Ser Ala Thr Val Ser Phe Ser Pro Ser Lys Arg Lys Leu Leu Ser Asp	
40 45 50	
cac ctc gcc gcc gcg tca ccc aaa aag cct aaa ctt tct cct cac act	306
His Leu Ala Ala Ala Ser Pro Lys Lys Pro Lys Leu Ser Pro His Thr	
55 60 65	
caa aac cca gta ccc gat ccc aat tta cac caa aga ttt ctc cag aga	354
Gln Asn Pro Val Pro Asp Pro Asn Leu His Gln Arg Phe Leu Gln Arg	
70 75 80 85	
ttt ctg gaa ccc tcg ccg gag gaa tat gtt ccc gaa acg tca tca tcg	402
Phe Leu Glu Pro Ser Pro Glu Glu Tyr Val Pro Glu Thr Ser Ser Ser	
90 95 100	
agg aaa tac aca cca ttg gaa cag caa gtg gtg gag cta aag agc aag	450
Arg Lys Tyr Thr Pro Leu Glu Gln Gln Val Val Glu Leu Lys Ser Lys	
105 110 115	
tac cca gat gtg gtt ttg atg gtg gaa gtt ggt tac agg tac aga ttc	498
Tyr Pro Asp Val Val Leu Met Val Glu Val Gly Tyr Arg Tyr Arg Phe	
120 125 130	
ttc gga gaa gac gcg gag atc gca gca cgc gtg ttg ggt att tac gct	546
Phe Gly Glu Asp Ala Glu Ile Ala Ala Arg Val Leu Gly Ile Tyr Ala	
135 140 145	
cat atg gat cac aat ttc atg acg gcg agt gtg cca aca ttt cga ttg	594
His Met Asp His Asn Phe Met Thr Ala Ser Val Pro Thr Phe Arg Leu	
150 155 160 165	
aat ttc cat gtg aga aga ctg gtg aat gca gga tac aag att ggt gta	642
Asn Phe His Val Arg Arg Leu Val Asn Ala Gly Tyr Lys Ile Gly Val	
170 175 180	
gtg aag cag act gaa act gca gcc att aag tcc cat ggt gca aac cgg	690
Val Lys Gln Thr Glu Thr Ala Ala Ile Lys Ser His Gly Ala Asn Arg	
185 190 195	
acc ggc cct ttt ttc cgg gga ctg tcg gcg ttg tat acc aaa gcc acg	738
Thr Gly Pro Phe Phe Arg Gly Leu Ser Ala Leu Tyr Thr Lys Ala Thr	
200 205 210	
ctt gaa gcg gct gag gat ata agt ggt ggt tgt ggt ggt gaa gaa ggt	786
Leu Glu Ala Ala Glu Asp Ile Ser Gly Gly Cys Gly Gly Glu Glu Gly	
215 220 225	
ttt ggt tca cag agt aat ttc ttg gtt tgt gtt gtg gat gag aga gtt	834
Phe Gly Ser Gln Ser Asn Phe Leu Val Cys Val Val Asp Glu Arg Val	
230 235 240 245	
aag tcg gag aca tta ggc tgt ggt att gaa atg agt ttt gat gtt aga	882
Lys Ser Glu Thr Leu Gly Cys Gly Ile Glu Met Ser Phe Asp Val Arg	
250 255 260	

gtc ggt gtt gtt ggc gtt gaa att tcg aca ggt gaa gtt gtt tat gaa	930
Val Gly Val Val Gly Val Glu Ile Ser Thr Gly Glu Val Val Tyr Glu	
265 270 275	
gag ttc aat gat aat ttc atg aga agt gga tta gag gct gtg att ttg	978
Glu Phe Asn Asp Asn Phe Met Arg Ser Gly Leu Glu Ala Val Ile Leu	
280 285 290	
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Ser Leu Ser Pro Ala Glu Leu Leu Leu Gly Gln Pro Leu Ser Gln Gln	
295 300 305	
act gag aag ttt ttg gtg gca cat gct gga cct acc tca aac gtt cga	1074
Thr Glu Lys Phe Leu Val Ala His Ala Gly Pro Thr Ser Asn Val Arg	
310 315 320 325	
gtg gaa cgt gcc tca ctg gat tgt ttc agc aat ggt aat gca gta gat	1122
Val Glu Arg Ala Ser Leu Asp Cys Phe Ser Asn Gly Asn Ala Val Asp	
330 335 340	
gag gtt att tca tta tgt gaa aaa atc agc gca ggt aac tta gaa gat	1170
Glu Val Ile Ser Leu Cys Glu Lys Ile Ser Ala Gly Asn Leu Glu Asp	
345 350 355	
gat aaa gaa atg aag ctg gag gct gct gaa aaa gga atg tct tgc ttg	1218
Asp Lys Glu Met Lys Leu Glu Ala Ala Glu Lys Gly Met Ser Cys Leu	
360 365 370	
aca gtt cat aca att atg aac atg cca cat ctg act gtt caa gcc ctc	1266
Thr Val His Thr Ile Met Asn Met Pro His Leu Thr Val Gln Ala Leu	
375 380 385	
gcc cta acg ttt tgc cat ctc aaa cag ttt gga ttt gaa agg atc ctt	1314
Ala Leu Thr Phe Cys His Leu Lys Gln Phe Gly Phe Glu Arg Ile Leu	
390 395 400 405	
tac caa ggg gcc tca ttt cgc tct ttg tca agt aac aca gag atg act	1362
Tyr Gln Gly Ala Ser Phe Arg Ser Leu Ser Ser Asn Thr Glu Met Thr	
410 415 420	
ctc tca gcc aat act ctg caa cag ttg gag gtt gtg aaa aat aat tca	1410
Leu Ser Ala Asn Thr Leu Gln Gln Leu Glu Val Val Lys Asn Asn Ser	
425 430 435	
gat gga tcg gaa tct ggc tcc tta ttc cat aat atg aat cac aca ctt	1458
Asp Gly Ser Glu Ser Gly Ser Leu Phe His Asn Met Asn His Thr Leu	
440 445 450	
aca gta tat gct tcc agg ctt ctt aga cac tgg gtg act cat cct cta	1506
Thr Val Tyr Ala Ser Arg Leu Leu Arg His Trp Val Thr His Pro Leu	
455 460 465	
tgc gat aga aat ttg ata tct gct cgg ctt gat gct gtt tct gag att	1554
Cys Asp Arg Asn Leu Ile Ser Ala Arg Leu Asp Ala Val Ser Glu Ile	
470 475 480 485	
tct gct tgc atg gga tct cat agt tct tcc cag ctc agc agt gag ttg	1602



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Val	Glu	Glu	Gly	Ser	Glu	Arg	Ala	Ile	Val	Ser	Pro	Glu	Phe	Tyr	Leu	
			505					510					515			
gtg	ctc	tcc	tca	gtc	ttg	aca	gct	atg	tct	aga	tca	tct	gat	att	caa	1698
Val	Leu	Ser	Ser	Val	Leu	Thr	Ala	Met	Ser	Arg	Ser	Ser	Asp	Ile	Gln	
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cgt	gga	ata	aca	aga	atc	ttt	cat	cgg	act	gct	aaa	gcc	aca	gag	ttc	1746
Arg	Gly	Ile	Thr	Arg	Ile	Phe	His	Arg	Thr	Ala	Lys	Ala	Thr	Glu	Phe	
	535					540					545					
att	gca	gtt	atg	gaa	gct	att	tta	ctt	gcg	ggg	aag	caa	att	cag	cgg	1794
Ile	Ala	Val	Met	Glu	Ala	Ile	Leu	Leu	Ala	Gly	Lys	Gln	Ile	Gln	Arg	
550				555					560						565	
ctt	ggc	ata	aag	caa	gac	tct	gaa	atg	agg	agt	atg	caa	tct	gca	act	1842
Leu	Gly	Ile	Lys	Gln	Asp	Ser	Glu	Met	Arg	Ser	Met	Gln	Ser	Ala	Thr	
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gtg	cga	tct	act	ctt	ttg	aga	aaa	ttg	att	tct	gtt	att	tca	tcc	cct	1890
Val	Arg	Ser	Thr	Leu	Leu	Arg	Lys	Leu	Ile	Ser	Val	Ile	Ser	Ser	Pro	
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gtt	gtg	gtt	gac	aat	gcc	gga	aaa	ctt	ctc	tct	gcc	cta	aat	aag	gaa	1938
Val	Val	Val	Asp	Asn	Ala	Gly	Lys	Leu	Leu	Ser	Ala	Leu	Asn	Lys	Glu	
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gcg	gct	gtt	cga	ggt	gac	ttg	ctc	gac	ata	cta	atc	act	tcc	agc	gac	1986
Ala	Ala	Val	Arg	Gly	Asp	Leu	Leu	Asp	Ile	Leu	Ile	Thr	Ser	Ser	Asp	
	615					620					625					
caa	ttt	cct	gag	ctt	gct	gaa	gct	cgc	caa	gca	gtt	tta	gtc	atc	agg	2034
Gln	Phe	Pro	Glu	Leu	Ala	Glu	Ala	Arg	Gln	Ala	Val	Leu	Val	Ile	Arg	
630					635					640				645		
gaa	aag	ctg	gat	tcc	tcg	ata	gct	tca	ttt	cgc	aag	aag	ctc	gct	att	2082
Glu	Lys	Leu	Asp	Ser	Ser	Ile	Ala	Ser	Phe	Arg	Lys	Lys	Leu	Ala	Ile	
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cga	aat	ttg	gaa	ttt	ctt	caa	gtg	tcg	ggg	atc	aca	cat	ttg	ata	gag	2130
Arg	Asn	Leu	Glu	Phe	Leu	Gln	Val	Ser	Gly	Ile	Thr	His	Leu	Ile	Glu	
		665					670						675			
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Leu	Pro	Val	Asp	Ser	Lys	Val	Pro	Met	Asn	Trp	Val	Lys	Val	Asn	Ser	
		680					685					690				
acc	aag	aag	act	att	cga	tat	cat	ccc	cca	gaa	ata	gta	gct	ggc	ttg	2226
Thr	Lys	Lys	Thr	Ile	Arg	Tyr	His	Pro	Pro	Glu	Ile	Val	Ala	Gly	Leu	
	695					700					705					
gat	gag	cta	gct	cta	gca	act	gaa	cat	ctt	gcc	att	gtg	aac	cga	gct	2274
Asp	Glu	Leu	Ala	Leu	Ala	Thr	Glu	His	Leu	Ala	Ile	Val	Asn	Arg	Ala	

710	715	720	725	
tcg tgg gat agt ttc ctc aag agt ttc agt aga tac tac aca gat ttt				2322
Ser Trp Asp Ser Phe Leu Lys Ser Phe Ser Arg Tyr Tyr Thr Asp Phe	730	735	740	
aag gct gcc gtt caa gct ctt gct gca ctg gac tgt ttg cac tcc ctt				2370
Lys Ala Ala Val Gln Ala Leu Ala Ala Leu Asp Cys Leu His Ser Leu	745	750	755	
tca act cta tct aga aac aag aac tat gtc cgt ccc gag ttt gtg gat				2418
Ser Thr Leu Ser Arg Asn Lys Asn Tyr Val Arg Pro Glu Phe Val Asp	760	765	770	
gac tgt gaa cca gtt gag ata aac ata cag tct ggt cgt cat cct gta				2466
Asp Cys Glu Pro Val Glu Ile Asn Ile Gln Ser Gly Arg His Pro Val	775	780	785	
ctg gag act ata tta caa gat aac ttc gtc cca aat gac aca att ttg				2514
Leu Glu Thr Ile Leu Gln Asp Asn Phe Val Pro Asn Asp Thr Ile Leu	790	795	800	805
cat gca gaa ggg gaa tat tgc caa att atc acc gga cct aac atg gga				2562
His Ala Glu Gly Glu Tyr Cys Gln Ile Ile Thr Gly Pro Asn Met Gly	810	815	820	
gga aag agc tgc tat atc cgt caa gtt gct tta att tcc ata atg gct				2610
Gly Lys Ser Cys Tyr Ile Arg Gln Val Ala Leu Ile Ser Ile Met Ala	825	830	835	
cag gtt ggt tcc ttt gta cca gcg tca ttc gcc aag ctg cac gtg ctt				2658
Gln Val Gly Ser Phe Val Pro Ala Ser Phe Ala Lys Leu His Val Leu	840	845	850	
gat ggt gtt ttc act cgg atg ggt gct tca gac agt atc cag cat ggc				2706
Asp Gly Val Phe Thr Arg Met Gly Ala Ser Asp Ser Ile Gln His Gly	855	860	865	
aga agt acc ttt cta gaa gaa tta agt gaa gcg tca cac ata atc aga				2754
Arg Ser Thr Phe Leu Glu Glu Leu Ser Glu Ala Ser His Ile Ile Arg	870	875	880	885
acc tgt tct tct cgt tcg ctt gtt ata tta gat gag ctt gga aga ggc				2802
Thr Cys Ser Ser Arg Ser Leu Val Ile Leu Asp Glu Leu Gly Arg Gly	890	895	900	
act agc aca cac gac ggt gta gcc att gcc tat gca aca tta cag cat				2850
Thr Ser Thr His Asp Gly Val Ala Ile Ala Tyr Ala Thr Leu Gln His	905	910	915	
ctc cta gca gaa aag aga tgt ttg gtt ctt ttt gtc acg cat tac cct				2898
Leu Leu Ala Glu Lys Arg Cys Leu Val Leu Phe Val Thr His Tyr Pro	920	925	930	
gaa ata gct gag atc agt aac gga ttc cca ggt tct gtt ggg aca tac				2946
Glu Ile Ala Glu Ile Ser Asn Gly Phe Pro Gly Ser Val Gly Thr Tyr	935	940	945	

cat gtc tcg tat ctg aca ttg cag aag gat aaa ggc agt tat gat cat	2994
His Val Ser Tyr Leu Thr Leu Gln Lys Asp Lys Gly Ser Tyr Asp His	
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gat gat gtg acc tac cta tat aag ctt gtg cgt ggt ctt tgc agc agg	3042
Asp Asp Val Thr Tyr Leu Tyr Lys Leu Val Arg Gly Leu Cys Ser Arg	
970                      975                      980	
agc ttt ggt ttt aag gtt gct cag ctt gcc cag ata cct cca tca tgt	3090
Ser Phe Gly Phe Lys Val Ala Gln Leu Ala Gln Ile Pro Pro Ser Cys	
985                      990                      995	
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Ile Arg Arg Ala Ile Ser Met Ala Ala Lys Leu Glu Ala Glu Val Arg	
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gca aga gag aga aat aca cgc atg gga gaa cca gaa gga cat gaa gaa	3186
Ala Arg Glu Arg Asn Thr Arg Met Gly Glu Pro Glu Gly His Glu Glu	
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ccg aga ggc gca gaa gaa tct att tcg gct cta ggt gac ttg ttt gca	3234
Pro Arg Gly Ala Glu Glu Ser Ile Ser Ala Leu Gly Asp Leu Phe Ala	
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gac ctg aaa ttt gct ctc tct gaa gag gac cct tgg aaa gca ttc gag	3282
Asp Leu Lys Phe Ala Leu Ser Glu Glu Asp Pro Trp Lys Ala Phe Glu	
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Phe Leu Lys His Ala Trp Lys Ile Ala Gly Lys Ile Arg Leu Lys Pro	
1065                      1070                      1075	
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Thr Cys Ser Phe	
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Lys Leu Leu Ser Asp His Leu Ala Ala Ala Ser Pro Lys Lys Pro Lys	

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Leu Ser Pro His Thr	Gln Asn Pro Val Pro Asp	Pro Asn Leu His Gln		
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Arg Phe Leu Gln Arg	Phe Leu Glu Pro Ser Pro	Glu Glu Tyr Val Pro		
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Glu Thr Ser Ser Arg	Lys Tyr Thr Pro Leu Glu	Gln Gln Val Val		
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Glu Leu Lys Ser Lys	Tyr Pro Asp Val Val Leu Met	Val Glu Val Gly		
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Tyr Arg Tyr Arg Phe	Phe Gly Glu Asp Ala Glu	Ile Ala Ala Arg Val		
	130	135	140	
Leu Gly Ile Tyr Ala	His Met Asp His Asn Phe Met	Thr Ala Ser Val		
145	150	155	160	
Pro Thr Phe Arg Leu	Asn Phe His Val Arg Arg	Leu Val Asn Ala Gly		
	165	170	175	
Tyr Lys Ile Gly Val	Val Lys Gln Thr Glu Thr	Ala Ala Ile Lys Ser		
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His Gly Ala Asn Arg	Thr Gly Pro Phe Phe Arg	Gly Leu Ser Ala Leu		
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Tyr Thr Lys Ala Thr	Leu Glu Ala Ala Glu Asp	Ile Ser Gly Gly Cys		
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Gly Gly Glu Glu Gly	Phe Gly Ser Gln Ser Asn Phe	Leu Val Cys Val		
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Val Asp Glu Arg Val	Lys Ser Glu Thr Leu Gly	Cys Gly Ile Glu Met		
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Ser Phe Asp Val Arg	Val Gly Val Val Gly	Val Glu Ile Ser Thr Gly		
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Glu Val Val Tyr Glu	Glu Glu Phe Asn Asp Asn Phe	Met Arg Ser Gly Leu		
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Glu Ala Val Ile Leu	Ser Leu Ser Pro Ala Glu	Leu Leu Leu Gly Gln		
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Pro Leu Ser Gln Gln	Thr Glu Lys Phe Leu Val	Ala Met Ala Gly Pro		
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Thr Ser Asn Val Arg	Val Glu Arg Ala Ser Leu	Asp Cys Phe Ser Asn		
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Gly Met Ser Cys Leu	Thr Val His Thr Ile Met	Asn Met Pro His Leu		
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Val Thr His Pro Leu	Cys Asp Arg Asn Leu Ile	Ser Ala Arg Leu Asp		
465	470	475	480	
Ala Val Ser Glu Ile	Ser Ala Cys Met Gly	Ser His Ser Ser Ser		
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Leu Ser Ser Glu Leu	Val Glu Glu Gly Ser	Glu Arg Ala Ile Val Ser		
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Lys	Ala	Thr	Glu	Phe	Ile	Ala	Val	Met	Glu	Ala	Ile	Leu	Leu	Ala	Gly
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Ala	Leu	Asn	Lys	Glu	Ala	Ala	Val	Arg	Gly	Asp	Leu	Leu	Asp	Ile	Leu
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Ile	Thr	Ser	Ser	Asp	Gln	Phe	Pro	Glu	Leu	Ala	Glu	Ala	Arg	Gln	Ala
625					630					635					640
Val	Leu	Val	Ile	Arg	Glu	Lys	Leu	Asp	Ser	Ser	Ile	Ala	Ser	Phe	Arg
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Lys	Lys	Leu	Ala	Ile	Arg	Asn	Leu	Glu	Phe	Leu	Gln	Val	Ser	Gly	Ile
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Thr	His	Leu	Ile	Glu	Leu	Pro	Val	Asp	Ser	Lys	Val	Pro	His	Asn	Trp
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Val	Lys	Val	Asn	Ser	Thr	Lys	Lys	Thr	Ile	Arg	Tyr	His	Pro	Pro	Glu
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Ile	Val	Ala	Gly	Leu	Asp	Glu	Leu	Ala	Leu	Ala	Thr	Glu	His	Leu	Ala
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Ile	Val	Asn	Arg	Ala	Ser	Trp	Asp	Ser	Phe	Leu	Lys	Ser	Phe	Ser	Arg
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Tyr	Tyr	Thr	Asp	Phe	Lys	Ala	Ala	Val	Gln	Ala	Leu	Ala	Ala	Leu	Asp
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Cys	Leu	His	Ser	Leu	Ser	Thr	Leu	Ser	Arg	Asn	Lys	Asn	Tyr	Val	Arg
		755					760					765			
Pro	Glu	Phe	Val	Asp	Asp	Cys	Glu	Pro	Val	Glu	Ile	Asn	Ile	Gln	Ser
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Gly	Arg	His	Pro	Val	Leu	Glu	Thr	Ile	Leu	Gln	Asp	Asn	Phe	Val	Pro
785					790					795					800
Asn	Asp	Thr	Ile	Leu	His	Ala	Glu	Gly	Glu	Tyr	Cys	Gln	Ile	Ile	Thr
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Ile	Ser	Ile	Met	Ala	Gln	Val	Gly	Ser	Phe	Val	Pro	Ala	Ser	Phe	Ala
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Lys	Leu	His	Val	Leu	Asp	Gly	Val	Phe	Thr	Arg	Met	Gly	Ala	Ser	Asp
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Ser	His	Ile	Ile	Arg	Thr	Cys	Ser	Ser	Arg	Ser	Leu	Val	Ile	Leu	Asp
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Ala Ala Ser Gly Gly Gly Gly Ser Gly Gly Pro Arg Phe Asn Val Arg  
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Asn Asp Ser Ser Leu Cys Met Lys Ala Asn Asp Val Ile Pro Gln Phe	
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Asp Val Pro Gly Pro Glu Thr Pro Gly Met Arg Pro Arg Ala Ser Arg	
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Cys Gly Glu Lys Lys Glu Val Asn Glu Gly Thr Lys Phe Glu Trp Leu	
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Leu Tyr Asp Arg Lys Thr Leu His Ile Pro Pro Asp Val Phe Lys Lys	
255 260 265	
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Met Ser Ala Ser Gln Lys Gln Tyr Trp Ser Val Lys Ser Glu Tyr Met	
270 275 280	
gac att gtg ctt ttc ttt aaa gtg ggg aaa ttt tat gag ctg tat gag	1035

Asp	Ile	Val	Leu	Phe	Phe	Lys	Val	Gly	Lys	Phe	Tyr	Glu	Leu	Tyr	Glu		
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Leu	Asp	Ala	Glu	Leu	Gly	His	Lys	Glu	Leu	Asp	Trp	Lys	Met	Thr	Met		
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agt	ggt	gtg	gga	aaa	tgc	aga	cag	ggt	ggt	atc	tct	gaa	agt	ggg	ata	1131	
Ser	Gly	Val	Gly	Lys	Cys	Arg	Gln	Val	Gly	Ile	Ser	Glu	Ser	Gly	Ile		
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gat	gag	gca	gtg	caa	aag	cta	tta	gct	cgt	gga	tat	aaa	ggt	gga	cga	1179	
Asp	Glu	Ala	Val	Gln	Lys	Leu	Leu	Ala	Arg	Gly	Tyr	Lys	Val	Gly	Arg		
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Ile	Glu	Gln	Leu	Glu	Thr	Ser	Asp	Gln	Ala	Lys	Ala	Arg	Gly	Ala	Asn		
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act	ata	att	cca	agg	aag	cta	ggt	cag	gta	tta	act	cca	tca	aca	gca	1275	
Thr	Ile	Ile	Pro	Arg	Lys	Leu	Val	Gln	Val	Leu	Thr	Pro	Ser	Thr	Ala		
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Ser	Glu	Gly	Asn	Ile	Gly	Pro	Asp	Ala	Val	His	Leu	Leu	Ala	Ile	Lys		
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gag	atc	aaa	atg	gag	cta	caa	aag	tgt	tca	act	gtg	tat	gga	ttt	gct	1371	
Glu	Ile	Lys	Met	Glu	Leu	Gln	Lys	Cys	Ser	Thr	Val	Tyr	Gly	Phe	Ala		
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Phe	Val	Asp	Cys	Ala	Ala	Leu	Arg	Phe	Trp	Val	Gly	Ser	Ile	Ser	Asp		
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gat	gca	tca	tgt	gct	gct	ctt	gga	gcg	tta	ttg	atg	cag	ggt	tct	cca	1467	
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Lys	Glu	Val	Leu	Tyr	Asp	Ser	Lys	Gly	Leu	Ser	Arg	Glu	Ala	Gln	Lys		
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Ala	Leu	Arg	Lys	Tyr	Thr	Leu	Thr	Gly	Ser	Thr	Ala	Val	Gln	Leu	Ala		
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cca	gta	cca	caa	gta	atg	ggg	gat	aca	gat	gct	gct	gga	ggt	aga	aat	1611	
Pro	Val	Pro	Gln	Val	Met	Gly	Asp	Thr	Asp	Ala	Ala	Gly	Val	Arg	Asn		
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ata	ata	gaa	tct	aac	gga	tac	ttt	aaa	ggt	tct	tct	gaa	tca	tgg	aac	1659	
Ile	Ile	Glu	Ser	Asn	Gly	Tyr	Phe	Lys	Gly	Ser	Ser	Glu	Ser	Trp	Asn		
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tgt	gct	ggt	gat	ggt	cta	aat	gaa	tgt	gat	ggt	gcc	ctt	agt	gct	ctt	1707	
Cys	Ala	Val	Asp	Gly	Leu	Asn	Glu	Cys	Asp	Val	Ala	Leu	Ser	Ala	Leu		

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Gly	Glu	Leu	Ile	Asn	His	Leu	Ser	Arg	Leu	Lys	Leu	Glu	Asp	Val	Leu	
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Lys	His	Gly	Asp	Ile	Phe	Pro	Tyr	Gln	Val	Tyr	Arg	Gly	Cys	Leu	Arg	
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att	gat	ggc	cag	acg	atg	gta	aat	ctt	gag	ata	ttt	aac	aat	agc	tgt	1851
Ile	Asp	Gly	Gln	Thr	Met	Val	Asn	Leu	Glu	Ile	Phe	Asn	Asn	Ser	Cys	
		555					560				565				570	
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Thr	Ala	Asn	Ser	Glu	Ser	Met	Gln	Ile	Thr	Gly	Gln	Tyr	Leu	His	Lys	
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Leu	Pro	Asp	Leu	Glu	Arg	Leu	Leu	Gly	Arg	Ile	Lys	Ser	Ser	Val	Arg	
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Ser	Ser	Ala	Ser	Val	Leu	Pro	Ala	Leu	Leu	Gly	Lys	Lys	Val	Leu	Lys	
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caa	cga	ggt	aaa	gca	ttt	ggg	caa	att	gtg	aaa	ggg	ttc	aga	agt	gga	2187
Gln	Arg	Val	Lys	Ala	Phe	Gly	Gln	Ile	Val	Lys	Gly	Phe	Arg	Ser	Gly	
			670					675					680			
att	gat	ctg	ttg	ttg	gct	cta	cag	aag	gaa	tca	aat	atg	atg	agt	ttg	2235
Ile	Asp	Leu	Leu	Leu	Ala	Leu	Gln	Lys	Glu	Ser	Asn	Met	Met	Ser	Leu	
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ctt	tat	aaa	ctc	tgt	aaa	ctt	cct	ata	tta	gta	gga	aaa	agc	ggg	cta	2283
Leu	Tyr	Lys	Leu	Cys	Lys	Leu	Pro	Ile	Leu	Val	Gly	Lys	Ser	Gly	Leu	
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gag	tta	ttt	ctt	tct	caa	ttc	gaa	gca	gcc	ata	gat	agc	gac	ttt	cca	2331
Glu	Leu	Phe	Leu	Ser	Gln	Phe	Glu	Ala	Ala	Ile	Asp	Ser	Asp	Phe	Pro	
		715					720				725				730	
aat	tat	cag	aac	caa	gat	gtg	aca	gat	gaa	aac	gct	gaa	act	ctc	aca	2379
Asn	Tyr	Gln	Asn	Gln	Asp	Val	Thr	Asp	Glu	Asn	Ala	Glu	Thr	Leu	Thr	
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Ile Leu Ile Glu Leu Phe Ile Glu Arg Ala Thr Gln Trp Ser Glu Val	
750 755 760	
att cac acc ata agc tgc cta gat gtc ctg aga tct ttt gca atc gca	2475
Ile His Thr Ile Ser Cys Leu Asp Val Leu Arg Ser Phe Ala Ile Ala	
765 770 775	
gca agt ctc tct gct gga agc atg gcc agg cct gtt att ttt ccc gaa	2523
Ala Ser Leu Ser Ala Gly Ser Met Ala Arg Pro Val Ile Phe Pro Glu	
780 785 790	
tca gaa gct aca gat cag aat cag aaa aca aaa ggg cca ata ctt aaa	2571
Ser Glu Ala Thr Asp Gln Asn Gln Lys Thr Lys Gly Pro Ile Leu Lys	
795 800 805 810	
atc caa gga cta tgg cat cca ttt gca gtt gca gcc gat ggt caa ttg	2619
Ile Gln Gly Leu Trp His Pro Phe Ala Val Ala Ala Asp Gly Gln Leu	
815 820 825	
cct gtt ccg aat gat ata ctc ctt ggc gag gct aga aga agc agt ggc	2667
Pro Val Pro Asn Asp Ile Leu Leu Gly Glu Ala Arg Arg Ser Ser Gly	
830 835 840	
agc att cat cct cgg tca ttg tta ctg acg gga cca aac atg ggc gga	2715
Ser Ile His Pro Arg Ser Leu Leu Leu Thr Gly Pro Asn Met Gly Gly	
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aaa tca act ctt ctt cgt gca aca tgt ctg gcc gtt atc ttt gcc caa	2763
Lys Ser Thr Leu Leu Arg Ala Thr Cys Leu Ala Val Ile Phe Ala Gln	
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Leu Gly Cys Tyr Val Pro Cys Glu Ser Cys Glu Ile Ser Leu Val Asp	
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Thr Ile Phe Thr Arg Leu Gly Ala Ser Asp Arg Ile Met Thr Gly Glu	
895 900 905	
agt acc ttt ttg gta gaa tgc act gag aca gcg tca gtt ctt cag aat	2907
Ser Thr Phe Leu Val Glu Cys Thr Glu Thr Ala Ser Val Leu Gln Asn	
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gca act cag gat tca cta gta atc ctt gac gaa ctg ggc aga gga act	2955
Ala Thr Gln Asp Ser Leu Val Ile Leu Asp Glu Leu Gly Arg Gly Thr	
925 930 935	
agt act ttc gat gga tac gcc att gca tac tcg gtt ttt cgt cac ctg	3003
Ser Thr Phe Asp Gly Tyr Ala Ile Ala Tyr Ser Val Phe Arg His Leu	
940 945 950	
gta gag aaa gtt caa tgt cgg atg ctc ttt gca aca cat tac cac cct	3051
Val Glu Lys Val Gln Cys Arg Met Leu Phe Ala Thr His Tyr His Pro	
955 960 965 970	

ctc acc aag gaa ttc gcg tct cac cca cgt gtc acc tcg aaa cac atg 3099  
 Leu Thr Lys Glu Phe Ala Ser His Pro Arg Val Thr Ser Lys His Met  
                   975                                  980                                  985

gct tgc gca ttc aaa tca aga tct gat tat caa cca cgt ggt tgt gat 3147  
 Ala Cys Ala Phe Lys Ser Arg Ser Asp Tyr Gln Pro Arg Gly Cys Asp  
                   990                                  995                                  1000

caa gac cta gtg ttc ttg tac cgt tta acc gag gga gct tgt cct gag 3195  
 Gln Asp Leu Val Phe Leu Tyr Arg Leu Thr Glu Gly Ala Cys Pro Glu  
                   1005                                  1010                                  1015

agc tac gga ctt caa gtg gca ctc atg gct gga ata cca aac caa gtg 3243  
 Ser Tyr Gly Leu Gln Val Ala Leu Met Ala Gly Ile Pro Asn Gln Val  
                   1020                                  1025                                  1030

gtt gaa aca gca tca ggt gct gct caa gcc atg aag aga tca att ggg 3291  
 Val Glu Thr Ala Ser Gly Ala Ala Gln Ala Met Lys Arg Ser Ile Gly  
                   1035                                  1040                                  1045                                  1050

gga aac ttc aag tca agt gag cta aga tct gag ttc tca agt ctg cat 3339  
 Glu Asn Phe Lys Ser Ser Glu Leu Arg Ser Glu Phe Ser Ser Leu His  
                   1055                                  1060                                  1065

gaa gac tgg ctc aag tca ttg gtg ggt att tct cga gtc gcc cac aac 3387  
 Glu Asp Trp Leu Lys Ser Leu Val Gly Ile Ser Arg Val Ala His Asn  
                   1070                                  1075                                  1080

aat gcc ccc att ggc gaa gat gac tac gac act ttg ttt tgc tta tgg 3435  
 Asn Ala Pro Ile Gly Glu Asp Asp Tyr Asp Thr Leu Phe Cys Leu Trp  
                   1085                                  1090                                  1095

cat gag atc aaa tcc tct tac tgt gtt ccc aaa taaatggcta tgacataaca 3488  
 His Glu Ile Lys Ser Ser Tyr Cys Val Pro Lys  
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ctatctgaag ctcgtaaagt cttttgcttc tctgatgttt attcctctta aaaaatgctt 3548  
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<223> Polypeptide MSH6

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 Gly Ser Gly Gly Pro Arg Phe Asn Val Arg Glu Gly Asp Ala Lys Gly  
                   35                  40                  45  
 Asp Ala Ser Val Arg Phe Ala Val Ser Lys Ser Val Asp Glu Val Arg  
                   50                  55                  60  
 Gly Thr Asp Thr Pro Pro Glu Lys Val Pro Arg Arg Val Leu Pro Ser

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Gly	Phe	Lys	Pro	Ala	Glu	Ser	Ala	Gly	Asp	Ala	Ser	Ser	Leu	Phe
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Glu	Arg	Ser	Arg	Glu	Asp	Val	Val	Pro	Leu	Asn	Asp	Ser	Ser	Leu
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Met	Lys	Ala	Asn	Asp	Val	Ile	Pro	Gln	Phe	Arg	Ser	Asn	Asn	Gly
	130					135					140			Lys
Thr	Gln	Glu	Arg	Asn	His	Ala	Phe	Ser	Phe	Ser	Gly	Arg	Ala	Glu
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Arg	Ser	Val	Glu	Asp	Ile	Gly	Val	Asp	Gly	Asp	Val	Pro	Gly	Pro
			165					170						175
Thr	Pro	Gly	Met	Arg	Pro	Arg	Ala	Ser	Arg	Leu	Lys	Arg	Val	Leu
			180					185					190	Glu
Asp	Glu	Met	Thr	Phe	Lys	Glu	Asp	Lys	Val	Pro	Val	Leu	Asp	Ser
		195					200					205		Asn
Lys	Arg	Leu	Lys	Met	Leu	Gln	Asp	Pro	Val	Cys	Gly	Glu	Lys	Lys
	210					215					220			Glu
Val	Asn	Glu	Gly	Thr	Lys	Phe	Glu	Trp	Leu	Glu	Ser	Ser	Arg	Ile
225					230					235				240
Asp	Ala	Asn	Arg	Arg	Arg	Pro	Asp	Asp	Pro	Leu	Tyr	Asp	Arg	Lys
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Leu	His	Ile	Pro	Pro	Asp	Val	Phe	Lys	Lys	Met	Ser	Ala	Ser	Gln
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Gln	Tyr	Trp	Ser	Val	Lys	Ser	Glu	Tyr	Met	Asp	Ile	Val	Leu	Phe
	275						280				285			Phe
Lys	Val	Gly	Lys	Phe	Tyr	Glu	Leu	Tyr	Glu	Leu	Asp	Ala	Glu	Leu
	290					295					300			Gly
His	Lys	Glu	Leu	Asp	Trp	Lys	Met	Thr	Met	Ser	Gly	Val	Gly	Lys
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Arg	Gln	Val	Gly	Ile	Ser	Glu	Ser	Gly	Ile	Asp	Glu	Ala	Val	Gln
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		340						345					350	Thr
Ser	Asp	Gln	Ala	Lys	Ala	Arg	Gly	Ala	Asn	Thr	Ile	Ile	Pro	Arg
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Pro	Asp	Ala	Val	His	Leu	Leu	Ala	Ile	Lys	Glu	Ile	Lys	Met	Glu
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Ser	Lys	Gly	Leu	Ser	Arg	Glu	Ala	Gln	Lys	Ala	Leu	Arg	Lys	Tyr
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Tyr	Phe	Lys	Gly	Ser	Ser	Glu	Ser	Trp	Asn	Cys	Ala	Val	Asp	Gly
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Asn	Glu	Cys	Asp	Val	Ala	Leu	Ser	Ala	Leu	Gly	Glu	Leu	Ile	Asn
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Pro	Tyr	Gln	Val	Tyr	Arg	Gly	Cys	Leu	Arg	Ile	Asp	Gly	Gln	Thr	Met
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Thr	Leu	Tyr	Lys	Tyr	Leu	Asp	Asn	Cys	Val	Ser	Pro	Thr	Gly	Lys	Arg
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Pro	Ala	Leu	Leu	Gly	Lys	Lys	Val	Leu	Lys	Gln	Arg	Val	Lys	Ala	Phe
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Phe	Glu	Ala	Ala	Ile	Asp	Ser	Asp	Phe	Pro	Asn	Tyr	Gln	Asn	Gln	Asp
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Asn	Gln	Lys	Thr	Lys	Gly	Pro	Ile	Leu	Lys	Ile	Gln	Gly	Leu	Trp	His
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Pro	Phe	Ala	Val	Ala	Ala	Asp	Gly	Gln	Leu	Pro	Val	Pro	Asn	Asp	Ile
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Ala	Thr	Cys	Leu	Ala	Val	Ile	Phe	Ala	Gln	Leu	Gly	Cys	Tyr	Val	Pro
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Cys	Glu	Ser	Cys	Glu	Ile	Ser	Leu	Val	Asp	Thr	Ile	Phe	Thr	Arg	Leu
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Gly	Ala	Ser	Asp	Arg	Ile	Met	Thr	Gly	Glu	Ser	Thr	Phe	Leu	Val	Glu
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Arg	Met	Leu	Phe	Ala	Thr	His	Tyr	His	Pro	Leu	Thr	Lys	Glu	Phe	Ala
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 Arg Ser Asp Tyr Gln Pro Arg Gly Cys Asp Gln Asp Leu Val Phe Leu  
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 1010 1015 1020  
 Ala Leu Met Ala Gly Ile Pro Asn Gln Val Val Glu Thr Ala Ser Gly  
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 Ala Ala Gln Ala Met Lys Arg Ser Ile Gly Glu Asn Phe Lys Ser Ser  
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 <223> Reverse primer for PCR amplification of ATHGENEA  
 microsatellite.

<400> 33  
 acataaccac aaataggggt gc

22

<210> 34  
 <211> 18  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Forward primer DMCIN-A for PCR on genomic DNA of  
 Arabidopsis thaliana ssp. Landsberg erecta "Ler".

<400> 34  
 gaagcgatat tgttcgtg

18

<210> 35  
 <211> 18

<212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer DMCIN-B for PCR on genomic DNA of  
         *Arabidopsis thaliana* ssp. Landsberg erecta "Ler".  
  
 <400> 35  
 agattgcgag aacattcc 18  
  
 <210> 36  
 <211> 31  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer DMCIN-1 for PCR on genomic DNA of  
         *Arabidopsis thaliana* ssp. Landsberg erecta "Ler".  
  
 <400> 36  
 acgcgtcgac tcagctatga gattactcgt g 31  
  
 <210> 37  
 <211> 29  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer DMCIN-2 for PCR on genomic DNA of  
         *Arabidopsis thaliana* ssp. Landsberg erecta "Ler".  
  
 <400> 37  
 gctctagatt tctcgctcta agactctct 29  
  
 <210> 38  
 <211> 32  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer DMCIN-3 for PCR on genomic DNA of  
         *Arabidopsis thaliana* ssp. Landsberg erecta "Ler".  
  
 <400> 38  
 gctctagagc ttctcttaag taagtgattg at 32  
  
 <210> 39  
 <211> 48  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer DMCIN-4 for PCR on genomic DNA of  
         *Arabidopsis thaliana* ssp. Landsberg erecta "Ler".  
  
 <400> 39  
 tcccccgggc tcgagagatc tccatggttt cttcagctct atgaatcc 48

<210> 40  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer DMC1a for PCR on genomic DNA of  
         *Arabidopsis thaliana* ssp. *Landsberg erecta* "Ler".  
  
 <400> 40  
 acgcgtcgac gaattcgcaa gtgggg 26  
  
 <210> 41  
 <211> 38  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer DMC1b for PCR on genomic DNA of  
         *Arabidopsis thaliana* ssp. *Landsberg erecta* "Ler".  
  
 <400> 41  
 tccatggaga tctcccggt accgatttgc ttcgaggg 38  
  
 <210> 42  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of ATEAT1  
         SSLP marker in *Arabidopsis thaliana* subspecies.  
  
 <400> 42  
 gccactgcgt gaatgatatg 20  
  
 <210> 43  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of ATEAT1  
         SSLP marker in *Arabidopsis thaliana* subspecies.  
  
 <400> 43  
 cgaacagcca acattaattc cc 22  
  
 <210> 44  
 <211> 18  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA63 SSLP  
         marker in *Arabidopsis thaliana* subspecies.

<400> 44 aaccaaggca cagaagcg	18
<210> 45 <211> 18 <212> DNA <213> Artificial Sequence	
<220> <223> Reverse primer for PCR amplification of NGA63 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 45 accaagtga tcgccacc	18
<210> 46 <211> 21 <212> DNA <213> Artificial Sequence	
<220> <223> Forward primer for PCR amplification of NGA248 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 46 taccgaacca aaacacaaag g	21
<210> 47 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Reverse primer for PCR amplification of NGA248 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 47 tctgtatctc ggtgaattct cc	22
<210> 48 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Forward primer for PCR amplification of NGA128 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 48 ggtctgttga tgtcgtaagt cg	22
<210> 49 <211> 22 <212> DNA <213> Artificial Sequence	

<220>  
 <223> Reverse primer for PCR amplification of NGA128  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 49  
 atcttgaaac ctttagggag gg 22

<210> 50  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Forward primer for PCR amplification of NGA280  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 50  
 ctgatctcac ggacaatagt gc 22

<210> 51  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Reverse primer for PCR amplification of NGA280  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 51  
 ggctccataa aaagtgcacc 20

<210> 52  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Forward primer for PCR amplification of NGA111  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 52  
 ctccagttgg aagctaaagg g 21

<210> 53  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Reverse primer for PCR amplification of NGA111  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 53  
 tgttttttag gacaaatggc g 21

<210> 54  
 <211> 20

<212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA168  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 54  
 ccttcacatc caaaacccac 20  
  
 <210> 55  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA168  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 55  
 gcacataccc acaaccagaa 20  
  
 <210> 56  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA1126  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 56  
 cgctacgctt ttcggtaaag 20  
  
 <210> 57  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA1126  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 57  
 gcacagtcca agtcacaacc 20  
  
 <210> 58  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA361  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 58  
 aaagagatga gaatttggac 20

<210> 59  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA361  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 59  
 acatatcaat atattaaagt agc 23  
  
 <210> 60  
 <211> 18  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA168  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 60  
 tcgtctactg cactgccg 18  
  
 <210> 61  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA168  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 61  
 gaggacatgt ataggagcct cg 22  
  
 <210> 62  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of AthBIO2  
         SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 62  
 tgacctctc ttccatggag 20  
  
 <210> 63  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of AthBIO2  
         SSLP marker in Arabidopsis thaliana subspecies.

<400> 63	
ttaacagaaa cccaaagctt tc	22
<210> 64	
<211> 21	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Forward primer for PCR amplification of AthUBIQUE SSLP marker in Arabidopsis thaliana subspecies.	
<400> 64	
aggcaaagt ccatttcatt g	21
<210> 65	
<211> 20	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Reverse primer for PCR amplification of AthUBIQUE SSLP marker in Arabidopsis thaliana subspecies.	
<400> 65	
acgacatggc agatttctcc	20
<210> 66	
<211> 21	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Forward primer for PCR amplification of NGA172 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 66	
agctgcttcc ttatagcgtc c	21
<210> 67	
<211> 19	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Reverse primer for PCR amplification of NGA172 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 67	
catccgaatg ccattgttc	19
<210> 68	
<211> 21	
<212> DNA	
<213> Artificial Sequence	



<220>  
 <223> Forward primer for PCR amplification of NGA126  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 68  
 gaaaaaacgc tactttcgtg g 21

<210> 69  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Reverse primer for PCR amplification of NGA126  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 69  
 caagagcaat atcaagagca gc 22

<210> 70  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Forward primer for PCR amplification of NGA162  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 70  
 catgcaattt gcatctgagg 20

<210> 71  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Reverse primer for PCR amplification of NGA162  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 71  
 ctctgtcact cttttcctct gg 22

<210> 72  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Forward primer for PCR amplification of NGA6 SSLP  
 marker in Arabidopsis thaliana subspecies.

<400> 72  
 tggatttctt cctctcttca c 21

<210> 73  
 <211> 21

<212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA6 SSLP  
         marker in Arabidopsis thaliana subspecies.  
  
 <400> 73  
 atggagaagc ttacactgat c 21  
  
 <210> 74  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA12 SSLP  
         marker in Arabidopsis thaliana subspecies.  
  
 <400> 74  
 aatggtgtcc tcccctcctc 20  
  
 <210> 75  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA12 SSLP  
         marker in Arabidopsis thaliana subspecies.  
  
 <400> 75  
 tgatgctctc tgaaacaaga gc 22  
  
 <210> 76  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA8 SSLP  
         marker in Arabidopsis thaliana subspecies.  
  
 <400> 76  
 gagggcaaat ctttatttcg g 21  
  
 <210> 77  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA8 SSLP  
         marker in Arabidopsis thaliana subspecies.  
  
 <400> 77  
 tggctttcgt ttataaacat cc 22

<210> 78  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA1107  
 SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 78  
 gcgaaaaaac aaaaaaatcc a 21  
  
 <210> 79  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA1107  
 SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 79  
 cgacgaatcg acagaattag g 21  
  
 <210> 80  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA225  
 SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 80  
 gaaatccaaa tcccagagag g 21  
  
 <210> 81  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA225  
 SSLP marker in Arabidopsis thaliana subspecies.  
  
 <400> 81  
 tctccccact agttttgtgt cc 22  
  
 <210> 82  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA249  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 82	
taccgtcaat ttcacgcgc	19
<210> 83	
<211> 22	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Reverse primer for PCR amplification of NGA249 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 83	
ggatccctaa ctgtaaaatc cc	22
<210> 84	
<211> 22	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Forward primer for PCR amplification of CA72 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 84	
aatcccagta accaaacaca ca	22
<210> 85	
<211> 20	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Reverse primer for PCR amplification of CA72 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 85	
cccagtctaa ccacgaccac	20
<210> 86	
<211> 20	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> Forward primer for PCR amplification of NGA151 SSLP marker in Arabidopsis thaliana subspecies.	
<400> 86	
gttttgggaa gttttgctgg	20
<210> 87	
<211> 24	
<212> DNA	
<213> Artificial Sequence	

<220>  
 <223> Reverse primer for PCR amplification of NGA151  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 87  
 cagtctaaaa gcgagagtat gatg 24

<210> 88  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Forward primer for PCR amplification of NGA106  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 88  
 gttatggagt ttctagggca cg 22

<210> 89  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Reverse primer for PCR amplification of NGA106  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 89  
 tgccccattt tggttcttctc 20

<210> 90  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Forward primer for PCR amplification of NGA139  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 90  
 agagctacca gatccgatgg 20

<210> 91  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Reverse primer for PCR amplification of NGA139  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 91  
 ggtttcgttt cactatccag g 21

<210> 92  
 <211> 22

<212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA76 SSLP  
 marker in *Arabidopsis thaliana* subspecies.  
  
 <400> 92  
 ggagaaaatg tcactctcca cc 22  
  
 <210> 93  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of NGA76 SSLP  
 marker in *Arabidopsis thaliana* subspecies.  
  
 <400> 93  
 aggcattggga gacatttacg 20  
  
 <210> 94  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of ATHS0191  
 SSLP marker in *Arabidopsis thaliana* subspecies.  
  
 <400> 94  
 ctccaccaat catgcaaagtg 20  
  
 <210> 95  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Reverse primer for PCR amplification of ATHS0191  
 SSLP marker in *Arabidopsis thaliana* subspecies.  
  
 <400> 95  
 tgatgttgat ggagatgggc a 21  
  
 <210> 96  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Forward primer for PCR amplification of NGA129  
 SSLP marker in *Arabidopsis thaliana* subspecies.  
  
 <400> 96  
 tcaggaggaa ctaaagtgag gg 22

<210> 97  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Reverse primer for PCR amplification of NGA129  
 SSLP marker in Arabidopsis thaliana subspecies.

<400> 97  
 cacactgaag atggtcttga gg

22

<210> 98  
 <211> 8062  
 <212> DNA  
 <213> Arabidopsis thaliana ecotype Columbia

<220>  
 <223> Genomic DNA sequence of AtMSH6

<400> 98  
 ttttttggtt gctaacaata aaggtatacg gttttatgtc atcaatataa ctatatataa 60  
 aagaaatgaa agatatatat tgttttttca tttatcaaac aaaacaacaa gacttttttt 120  
 ttacttttta cattggtcaa caaaatacaa gataaacgac atcgtttaat catttcccaa 180  
 ttttaccctt aagtttaaca cctagaacct tctccatctt cgcaagcaca gcctgattag 240  
 gaacagcttt accattctca tattcctgaa ctacctgagt cctctcattg atctgtttcg 300  
 ccaaaccgct ttgtgacatc ttcttctcca atctcgcttt ctgtatcatc aacctcacct 360  
 ctgctttcac acgatccatc gccgcaggct ctgtttcttc ttccagcttc ttcgtgttaa 420  
 tcaccggaac cgccgtagat ttcccctttt tgttcgaacc ggcacgaaat ttcttaaccg 480  
 tttgaaccgc gacaccgttt ctcagagctg cgtaaacgcg ttccggatcg cgtaggtctt 540  
 ggctcttttg ttttgatttg tggagaacta ctggttccca gtcttggtgt actgctcctg 600  
 ggtatctgct cgccatcgct gatgaattga gagaaaggaa caacgcgaaa attttattaa 660  
 tctgagtttt gaaattgaga aacgatgaag atgaagaatg ttgttgagag gattgtgata 720  
 tttatatata cgaagatttg tttctggaga attcgatcat ctttttctcc attttctgt 780  
 ctggaacgct cttagagatg attgacgacg tgtcattatc tgatttgag ttaaccaatg 840  
 ctttttgggt tggattcgtg gtacaccata ttatccgatt tggctcaatg gttttatata 900  
 aatttggttt tcggttcggt tatgagttat cattaaaatt aagctaacca aaaattttcg 960  
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 ggggttagcc gaaccgaata ccaatgcctg attgactcgt tggctagaaa gatccaacgg 1080  
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 aaaaaaagtt gagccctgag gagtatcgtt tccgccattt ctacgacgca aggcgaaaat 1200  
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 cactctctct cacaattcca aaaaatgcag cgccagagat cgattttgtc tttcttccaa 1320  
 aaaccacagg cggcgactac gaagggtttg gtttccggcg atgctgctag cggcgggggc 1380  
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 gttttgctgt ttcgaaatct gtcgatgagg ttagaggaac ggatactcca ccggagaagg 1500  
 ttccgcgtcg tgtcctgccc tctggattta agccggctga atccgcgggt gatgcttcgt 1560  
 ccctgttctc caatattatg cataagtttg taaaagtcga tgatcgagat tgttctggag 1620  
 agaggtacta atcttcgatt ctcttaattt tgttatcttt agctggaaga agaagattcg 1680  
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 atgatgttat tcctcaattt cgttccaata atggtaaaac tcaagaaaga aaccatgctt 1860  
 ttagtttcag tgggagagct gaacttagat cagtagaaga tataggagta gatggcgatg 1920  
 ttctgtgtcc agaaacacca gggatgcgtc cacgtgcttc tcgcttgaag cgagttctgg 1980  
 aggatgaaat gacttttaag gaggataagg ttctgttatt ggactctaac aaaaggctga 2040  
 aaatgctcca ggatccgggt tgtggagaga agaaagaagt aaacgaagga accaaatttg 2100

aatggcttga	gtcttctcga	atcaggggatg	ccaatagaag	acgtcctgat	gatccccctt	2160
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gtaactatta	atctagtgtt	caatccattt	cctcaatgtg	atgtgttcac	ttacatctgt	2340
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gtgggtaagg	gaaccatcat	actttatgga	attcgtttac	tgctacttcg	gctaggattt	2640
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ttattcggtta	tataataagt	cttttcatca	aggagtaaca	aacaaaactt	gcacaatatt	2760
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tttcaagcct	tgtgttgaaa	ctggatagtt	acatatgctt	ccaacagaaa	ctagcatgca	2940
gattcatatg	ctttcctatt	ctactaatta	tgtattgaca	cactcgttgt	ttcttttgaa	3000
agatataaag	ttggacgaat	cgagcagcta	gaaacatctg	accaagcaaa	agccagaggt	3060
gctaatactg	taagttttct	tggtatgggtc	aaggagagtg	ttgcagactg	tttttgatca	3120
tttctttttc	tgtacattac	tttcatgctg	taattaactc	aatggctatt	ctgggtctgat	3180
tatcagataa	ttccaaggaa	gctagtccag	gtattaactc	catcaacagc	aagcgaggga	3240
aacatcgggc	ctgatgccgt	ccatcttctt	gctataaaaag	aggtttgtta	tttacttatt	3300
tatcttatca	tggttcagttc	atccaagtc	tgaaaaatta	cactcttctt	taccaatctt	3360
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Asp	Lys	Asn	Leu	Ile	Ser	Met	Lys	Asn	Ile	Lys	Glu	Tyr	Asp	Phe	Val
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Lys	Ser	Gln	His	Ser	Met	Val	Leu	Asp	Gly	Ile	Thr	Leu	Gln	Asn	Leu
	610					615					620				
Glu	Ile	Phe	Ser	Asn	Ser	Phe	Asp	Gly	Ser	Asp	Lys	Gly	Thr	Leu	Phe
625					630					635					640
Lys	Leu	Phe	Asn	Arg	Ala	Ile	Thr	Pro	Met	Gly	Lys	Arg	Met	Met	Lys
				645					650					655	
Lys	Trp	Leu	Met	His	Pro	Leu	Leu	Arg	Lys	Asn	Asp	Ile	Glu	Ser	Arg
			660					665					670		
Leu	Asp	Ser	Val	Asp	Ser	Leu	Leu	Gln	Asp	Ile	Thr	Leu	Arg	Glu	Gln
		675					680					685			
Leu	Glu	Ile	Thr	Phe	Ser	Lys	Leu	Pro	Asp	Leu	Glu	Arg	Met	Leu	Ala
	690					695					700				
Arg	Ile	His	Ser	Arg	Thr	Ile	Lys	Val	Lys	Asp	Phe	Glu	Lys	Val	Ile
705					710					715					720
Thr	Ala	Phe	Glu	Thr	Ile	Ile	Glu	Leu	Gln	Asp	Ser	Leu	Lys	Asn	Asn
				725					730					735	
Asp	Leu	Lys	Gly	Asp	Val	Ser	Lys	Tyr	Ile	Ser	Ser	Phe	Pro	Glu	Gly

[illegible]

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Ile Ala Tyr Gly Asp Gly Leu Lys Asn Thr Lys Leu Gly Ser Gly Glu
                      1205                      1210                      1215
Gly Val Leu Asn Tyr Asp Trp Asn Ile Lys Arg Asn Val Leu Lys Ser
                      1220                      1225                      1230
Leu Phe Ser Ile Ile Asp Asp Leu Gln Ser
                      1235                      1240

```